AN EXAMINATION OF A CHARGE BROUGHT AGAINST INOCULATION.

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AN EXAMINATION OF A CHARGE BROUGHT AGAINST INOCULATION,

BY DE HAEN, RAST, DIMSDALE, and other Writers.

By JOHN WATKINSON, M.D. k

Non mihi, ſed rationi, aut quæ ratio eſſe videtur
Milito; ſecurus quid mordicus hic tenet, aut hic.

SCALIGER.

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M,DCC,LXXVII.

MVSEVM
BRITAN
NICVM

TO
The VICE-PRESIDENTS,
TREASURER,
AND THE
Reſt of the GOVERNORS
OF THE
DISPENSARY
FOR
GENERAL INOCULATION,
This EXAMINATION, &c.
IS
With the greateſt Reſpect,
Inſcribed,
By their
Moſt obedient
humble Servant,

JOHN WATKINSON.

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PREFACE.

THE Charge, which I have examined in the following pages, ſtrikes at the very root of Inoculation, in this metropolis.

For, if it be true, that the practice of this art has, for a ſeries of years, augmented the mortality of the natural Small-pox, it has certainly, been, hitherto, injurious to ſociety ;—and, if from the extenſion of that practice, a proportional increaſe of the mortality is to be

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apprehended, as a late reſpectable writer ſeems to think, I cannot ſee on what principle, either of humanity, or policy, the further uſe of it can be juſtified.

But, confidently, as this charge has been brought, I have attempted to ſhew, that it is totally deſtitute of foundation.

Whether I have ſucceeded, or not, the public will determine.—The Charge and the Anſwer are both before them.

EXAMINATION
OF A
CHARGE,
WHICH HAS BEEN BROUGHT AGAINST
INOCULATION,
By DE HAEN, RAST, DIMSDALE, and other WRITERS.

AMONG the various improvements which do honour to the age we live in, the preſent method of inoculating the ſmall-pox is far from being the leaſt.

In the practice of this happy invention, we ſee human ingenuity oppoſing itſelf to the ravages of a dreadful diſeaſe, and the medical art triumphing, as it were, over the powers of death.

The numerous objections which malice, envy, and ignorance had brought againſt it, are now, as far as they reſpect its utility to *individuals*, gradually ſinking into oblivion; and "time, who obliterates the fictions of opinion, and confirms the deciſions of nature," has given his teſtimony in its favour.

But, the victory is yet incomplete.—Inoculation is repreſented, as being hurtful to the *community*.—It is charged with ſpreading the variolous contagion, and increaſing the mortality of the *natural* ſmall-pox.

Whether this charge be well founded or not ? is a queſtion of public concern. The public have therefore a right, to all the evidence which is neceſſary to the juſt ſolution of it.

That evidence, with a few reflections naturally ariſing from it, I mean now to lay before them, with brevity and candour.

In ſupport of the above charge, the London Bills of Mortality are appealed to.

Theſe, indeed, ſhew that the mortality from the ſmall-pox has been increaſed ſince the introduction of inoculation, but, they contain no proof that inoculation has occaſioned it, on the contrary, they clearly demonſtrate that the accuſation is unjuſt.

But, previous to the ſtating of any evidence in exculpation of inoculation, it may be proper to inquire, what is the amount of the abovementioned increaſe, and in what manner the fact has been aſcertained ?

According to the celebrated De Haen, the Bills of Mortality of this City evince, that, one ſixth more have died of the ſmall pox in the ſpace of twenty two years ſince the commencement of inoculation, than in the ſame period of time before the introduction of that practice.

And, by a compariſon of the ſame kind made by another opponent to inoculation, it appears, that, in the ſpace of thirty-eight years the difference is ſtill greater.

Baron Dimſdale, who follows Dr. Jurin's method of computation, finds, that, in a period of thirty two years, beginning with the year 1734, the deaths by the ſmall-pox amounted to one-eighth of the whole number; and in the eight ſucceeding years to ſomewhat more than one-ſixth. “ But ” ſays he “ if the eight years are divided it will appear that the deaths from the ſmall-pox in the firſt four years are 8642; the medium for each of thoſe years will be 2160.”

“ For the laſt four years the numbers are 10179, the medium for each 2544.”*

It is, however, manifeſt, that in a city, like London, where the number of inhabitants, from various cauſes, muſt be continually fluctuating, ~~that~~ no certain concluſion can poſſibly be drawn, with reſpect to the increaſe or decreaſe of the mortality of the ſmall-pox, from the *abſolute* number of deaths by that diſeaſe in one period, compared with the abſolute number of deaths by the ſame diſeaſe in another period.

This material circumſtance ſeems to have been wholly overlooked by De Haen; and in the laſt mentioned calculation, it has likewiſe eſcaped the attention of the Baron.

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* Thoughts on general and partial inoculations.

Other writers have avoided this error, They have endeavoured to trace the variations in the mortality of this diſtemper, not from the *abſolute*, but the *relative* number of its victims, that is, from the proportion which they bore to thoſe of all the other diſeaſes at one time, compared with the proportion which they bore to them at another.

But, unexceptionable as this mode of inveſtigation may at firſt ſight appear to be, a ſlight examination will diſcover that it is not wholly free from fallacy.

It is true, that, by comparing, the number of perſons who have periſhed at different times, by the ſmall-pox, with the number of thoſe who have been cut off by the other diſeaſes, any exceſs or defect in the former with reſpect to the latter, may readily be detected. But, if the influence of any cauſe which tends to increaſe the general mortality, without having any effect upon that by the ſmall-pox, ſhould be diminiſhed, it is evident, that the variations in the mortality by the latter, relative to the number of inhabitants, would not be ſhewn by the above compariſon.—

Such a cauſe, for example, is the impurity of the air, the influence of which, there is reaſon to believe, has been conſiderably diminiſhed by the various improvements which have been made in this metropolis. For it does not appear, that it is ſo much from the magnitude of a city that the air becomes contaminated, as from the narrowneſs and uncleanlineſs of its ſtreets.

The air of Edinburgh is as unhealthy as that of London, yet the inhabitants contained in the former of theſe cities do not amount to a ſixteenth part of the number contained in the latter.

It has been computed by a very accurate and able writer,* that, about one in twenty of the inhabitants of this city dies annually; whereas in the pariſh of Holy Croſs near Shrewſbury only one in thirty three dies in the ſame period of time; at Stoke Damarell in Devonſhire only one in fifty four; and, according to a late publication by Dr. Percival; the diſproportion in ſome places is ſtill greater.

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* Dr. Price.

This ſtriking difference between the duration of life in town and in the country, is chiefly to be attributed to the greater purity of the air in the latter than in the former.

If, therefore, in conſequence of the improvements above alluded to, the ſtate of the air in London, has in any degree approached to the ſtate of that in the country, it follows, *cæteris paribus*, that the number of deaths, in proportion to the number of inhabitants, muſt be diminiſhed.

But, as the ſmall-pox is a diſeaſe which neither owes its exiſtence to, nor ſeems to be affected by, that kind of impurity of which we are now ſpeaking; a diſeaſe which rages with equal violence in the congregated city, and the thinly peopled village; it is *poſſible* that its victims may at the preſent time bear nearly the ſame proportion to the number of inabitants, though not to the number of deaths, that they did formerly.

I ſhall admit, however, that the increaſe of the mortality in queſtion, is accurately aſcertained, and proceed to ſhew that the inference deduced from it is nevertheleſs falſe.

If inoculation have ſpread the infection, and augmented the mortality in the degree contended for, the inoculated ſmall-pox muſt, neceſſarily, be very contagious. Whether it be ſo, or not, let reaſon and obſervation determine.

As the puſtules in the artificial diſeaſe are generally very few in number, and the quantity of freſh air applied is large, it is rational to ſuppoſe that the effluvium ariſing is immediately combined with the atmoſphere as a menſtruum, and like other vapours, in a ſimilar ſtate, deprived of its peculiar properties: but, as the puſtules in the natural diſeaſe are more numerous, the effluvium ariſing will be much greater, and the combination above mentioned not ſo ſoon effected; and, if the patient be confined to his chamber, which is generally the caſe, the air muſt quickly be ſaturated with the effluvium emitted, and, conſequently, that which ariſes afterwards will float in it unaltered.

In the two latter inſtances, the contagion may readily be conveyed through the medium of the air; in the former, it can ſcarcely be communicated unleſs by contact.

The intenſity of the contagion is therefore to be eſtimated by the number of puſtules, directly, and the quantity of air applied, inverſely.

The exceptions to this general rule, I am not ſolicitous to diſcover.—It is ſufficient for my preſent purpoſe that the above reaſoning evinces what obſervation (as I ſhall afterwards ſhew) confirms, that, there may be a very conſiderable difference between the natural and inoculated ſmall-pox, with reſpect to their contagious power, though none with reſpect to their eſſence.

Whether, indeed, this diſeaſe be produced naturally, or artificially, it is far leſs contagious than it is generally ſuppoſed to be. For, although, in either of theſe ſtates, it may be communicated, with the difference above deſcribed, to ſome few, or, in technical language, may be propagated ſporadically; in neither, unleſs a certain conſtitution of the air is preſent, can it be ſpread epidemically.—When that conſtitution is preſent, the contagion is rapidly diffuſed, independently of perſonal communication between the infected and thoſe liable to receive the infection; when it is not preſent, the contagion ſoon ceaſes to multiply itſelf, though under circumſtances the moſt favourable to its propagation.

Baron Dimſdale, who has delivered his ſentiments on this ſubject, in the publication before mentioned,* tells us, 'that he 'knows it has been ſaid, and even pub-'licly declared, that the ſmall-pox from in-'oculation is ſo mild, as *ſcarcely* to be infec-'tious to others;' but' ſays he 'if this was 'true, how comes it that matter, taken from 'inoculated patients, conveys the diſtem-'per with equal certainty, as if it was taken 'from the natural ſmall-pox? Is it not

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* Page 3.

‘ morally certain, that the effluvia partake ‘ of the ſame infectious quality? No phyſican of any experience, I am ſure, will ‘ ever countenance ſuch an opinion.—But ‘ leſt it ſhould prevail, and do miſchief ‘ among the ignorant and credulous, I think ‘ it incumbent on me to contradict ſo dangerous and unwarrantable an aſſertion.’

But ‘ dangerous and unwarrantable’ as this aſſertion may be, Baron Dimſdale maintains it himſelf, at leaſt ſubſtantially, in the very next paragraph, and thereby gives his own teſtimony in favour of that opinion which he is ‘ ſure ‘ no phyſician of any experience will ever ‘ countenance.’

‘ In fact’ ſays he, ‘ it is certain that ‘ the ſmall-pox is infectious *in proportion* ‘ *to the number and malignity of the puſtles*, ‘ and ſo far there is uſually leſs danger ‘ from the artificial diſeaſe, than from the ‘ natural.’

From which, I think, it clearly follows, that when the puſtules are free from malignity, and very few in number, which is generally the caſe in the inoculated ſmall-pox, the diſeaſe may be 'ſo mild 'as ſcarcely to be infectious to others.'

But, whatever might have been the idea which the Baron intended to convey, I do not heſitate to affirm, that the above inference contains a well eſtabliſhed truth.

Medicus, a very eminent and experienced German phyſician, obſerves in one of his epiſtles to Dr. Petit of Paris, that the variolous contagion is ſo rarely propagated by the artificial diſeaſe, that although a prodigious number of people have been inoculated, not more than ten inſtances, perhaps, can be reckoned, in which it has communicated the infection, notwithſtanding the pains which have been taken to diſcover that pretended quality of it.

Si donc, ſays he, *nous voulons connoitre et determiner avec preciſion le vrai degré, la vraie force de cette eſpece de contagion, il nous faut conſulter ce qui arrive dans le petites verole inoculées, ou l'infection d'un air epidemique-*

epidemique n'a point lieu. Or la petite verole ſe communique ſi rarement par les inoculés, que ſur la quantité prodigieuſe qu'il y a eu d'inoculés on ne ſauroit peut-être compter plus de dix exemples d'une pareille infection malgré les ſoins qu'on s'eſt donné pour tacher de decouvrir cette pretendue qualité de la petite verole inoculée.

Miege, a celebrated inoculator, declares that his own experience has afforded but one example of the contagion being propagated by the inoculated ſmall-pox, and that, that happened by contact, *per oſculum, ideoque proximum per contactum accidit.* Nierop. de contag variol.

Sulzer, who appears to have had conſiderable practice in this art, aſſures profeſſor Schroëder of Gottingen, in a letter which he wrote to him in the year 1765, that he had not ſeen a ſingle caſe in which the inoculated ſmall-pox had by contagion given the diſeaſe to another.

Je puis vous aſſurer Monſieur, ſays he, *que depuis* 1758, *que j'ai inoculé bon nombre toutes les années, et dans toutes les ſaiſons,*

ſons, je n'ai pas vu un ſeul cas, ou j'euſes pu dire, la petite verole inoculée a donnée par contagion a un autre enfant ou adulte la maladie : encore moins a t'elle cauſée un epidemie de petite verole, quoique j'aye inoculé dans la ville et dans les villages, et jamais apart dans des maiſons. Il eſt vray, que je prends les precautions dans le tems de la ſuppuration de ne laiſſer aprocher du malade ceux qui pourroient etre infectés, et que je fais changer d'habit, laver, et parfûmer ceux qui pourroient aiſement porter la contagion, ſur tout ſi les patients ont bon nombre de petite verole. Vid. Nierop de contag. variol.

A ſimilar aſſurance is given by Dr. Odier of Geneva to the author of the *Journal de medecine**. Speaking of the two letters that he had ſome time before addreſſed to De Haen, in which he had ſtated the objection derived from the bills of mortality in its full force, he ſays, *Juſqu'ici je n'ai fait que donner à l'objection que j'avois en vue toute le force dont elle me paroît ſuſceptible; il me reſte à examiner juſqu'àquel point elle eſt fondée. Je ſuis ſi perſuade qu'elle ne l'eſt point du tout, que depuis que je commence à pratiquer le medecine, je n'ai*

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* Journal de Medecine, &c. Vol. XLII.

ceſſé de recommander hautement l'inoculation, & d'inoculer moîmeme, toutes les fois que l'occaſion s'en eſt préſentée. Si je n'avois pas été déja parfaitement convàincu, le ſuccés que j'ai eu juſqu'ici ſeroit plus que ſuffiſant pour réſoudre tous me doutes, d'autant plus que je n'ai point encore obſervé que la petite vérole innoculée ſe communiquât à perſonne par contagion."

Mr. Holwell, who reſided upwards of thirty years in the Eaſt Indies, and whoſe account of the manner of inoculating the ſmall-pox in that country, ſhews the attention that he paid to this ſubject, informs us, that, 'notwithſtanding the 'multitudes that are every year inoculated 'there in the uſual ſeaſon, it adds no malignity to the diſeaſe taken in the natural 'way, nor *ſpreads the infection as is commonly imagined in Europe.*'*

But, the following fact atteſted by Dr. Schwenke a phyſician of diſtinguiſhed reputation in Holland, is ſufficient, I think, to remove every doubt that may remain on this head.

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* An account of the manner of inoculating for the ſmall-pox in the Eaſt Indies.

About the end of the year 1767, and the beginning of the year 1768, two hundred people, at leaſt, were inoculated at the Hague, who without much regard either to themſelves or others, frequented all places of public reſort; notwithſtanding which, no epidemic was produced, nor in the whole year did more than eight perſons die of the ſmall-pox, and of theſe, three died in the ſpring, one by inoculation, and two by the natural diſeaſe which they had caught at ſome other place and carried with them to the Hague; the remaining five died towards the end of the year.—*Vid. M. W. Schwenke Epiſt. in Cel. Sandifort. Biblioth. med. Tom.* 6.

To theſe teſtimonies, the number of which might have been greatly augmented, I ſhall beg leave to ſubjoin my own. I have paid particular attention to the point in queſtion, ſince the eſtabliſhment of the diſpenſary for general inoculation, and can with truth affirm, that a ſingle inſtance has not yet occurred in that charity, in which the contagion has been ſpread by an inoculated patient. Where the chance of ſpreading it has been apparently great, I have been very ſtrict in my inquiries.—In many caſes the circumſtances have been ſuch, that if the apprehenſions of a celebrated inoculator were well founded, the diſtemper muſt inevitably have been communicated.

Some have been inoculated in narrow ſtreets, in the midſt of thoſe who were obnoxious to the ſmall pox, and others in little courts, where, according to the common opinion, the danger of communicating the diſeaſe was ſtill greater.

In the latter caſe, the patient has ſometimes been kept in a little room on the ground floor, the door of which opened directly into the court, and in the day time was ſeldom ſhut. Before this door, and within a few yards of the perſon inoculated, a number of children have continued to play during the whole courſe of the diſorder, and, as has been already affirmed, without receiving the infection.

Baron

Baron Dimſdale, indeed, aſſerts, that inſtances of a contrary kind have frequently fallen within his obſervation. But, as the Baron does not ſeem to have been aware of the great influence of the epidemic conſtitution of the air—it is poſſible that what he ſhould have attributed to this cauſe, he has ſometimes imputed to ſimple contagion.—Be that as it may, a writer in the *Monthly Ledger*, * under the ſignature of J. S. who had an opportunity of ſeeing the practice of inoculation in the country where theſe inſtances happened, ſpeaks of the conſequences of it in a language very different from that which is held by the Baron.

" I have been witneſs, ſays he, to the progreſs of inoculation, from the introduction of the Suttonian method, thro' a very conſiderable part of a populous country: at the introduction of that method, the ſubjects obnoxious to the diſeaſe were more numerous in proportion to the exempts, than they could poſſibly be in London at any period. Baron Dimſdale under whoſe direction a principle ſhare of the practice was conducted, was not deficient in impóſing ſuch reſtrictions on his patients as he thought neceſſary for the public ſafety; but I believe theſe reſtrictions were not very ſcrupulouſly regarded. There werepractitioners, whoſe practice was by no means inconſiderable and whoſe reſtrictions were leſs ſtrenuouſly impoſed and more frequently broken; yet few inſtances of infection from inoculation were heard of; that there were not twenty times more was matter of ſurprize to thoſe acquainted with the contagious nature of the diſeaſe, and is to me an irrefragable proof of the truth of what I have aſſerted, that more miſchief is likely to be done by one patient, in the natural confluent diſeaſe, than by fifty inoculated patients under the preſent mode of management. Your correſpondent may probably object that there might be many more inſtances of infection from inoculation at the time I have mentioned, than could have come to my knowledge. But thoſe who know moſt of the country know that it is a place where things cannot be ſecreted, a tranſaction at ten miles diſtance is more talked of than a tranſaction at two ſtreets diſtance in London. The practice was the general topic of converſation, I was far from being uninquiſitive about its ſucceſs, and there were opponents of it who would have made their advantage of *any injury* which it might have produced."

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* Vol. I. Page 523.

Dr. Tiſſot, in a piece intitled, *L'inoculation juſtifiée*, very juſtly obſerves, that the ſmall pox is indeed a contagious diſeaſe, but, that it does not propagate itſelf ſo much by contagion, as by an *infection of the air*, produced by cauſes which are unknown to us.

The truth of this obſervation, is exemplified in a very ſtriking manner, by a fact which is related by Dr. James Sims in his *Obſervations on Epidemic Diſorders.*

" About the autumnal equinox," ſays he, " bilious diſorders declined, giving way to the ſmall-pox, that with unheard of havock deſolated the cloſe of this year, and the ſucceeding ſpring of 1767. They had appeared above a year before, along the eaſtern coaſt of the kingdom, and proceeded ſlowly weſtward with ſo even a pace, that a curious perſon might with eaſe have computed the rate of their progreſs. In this they were ſcarcely to be interrupted, as appeared by the following inſtance. The children of ſoldiers on their march, had brought them from other places to ſome towns here, during the preceding ſummer, and although they were of a malignant kind, the afflicted all dying, and therefore moſt fit to propagate the infection, yet *not one of the inhabitants received them, until in their regular progreſs they had travelled over the intermediate ſpace*."

Nothing, indeed, is more manifeſt, than, that the natural ſmall-pox, though, in general, much more contagious than the artificial, does not readily multiply itſelf, unleſs favoured by a miaſmatic conſtitution of the air.—The ſame remark may be extended to other contagious diſeaſes.—*Etenim contagium morboſum*, ſays Van Swieten, *requiri cauſas prædiſponentes, ut morbus ille naſcatur certum eſt.* Tom. V. P. IV.

And, according to Sydenham, even the plague itſelf, without the concurrence of a fit diſpoſition of the air, cannot excite an epidemic.—*Interea aeris diſpoſitionem quantumvis* λοιμώδη, *peſti ſuſcitandæ per ſe imparem eſſe, vehementer ſuſpicor; quin peſtilentiæ morbum alicubi ſemper ſuperſtitem aut per fomitem, aut per peſtiferi alicujus appulſum, e locis infectis in alios deferri; ibidemque non niſi accidente ſimul idonea aëris diatheſi popularem fieri.* Sect. 2. cap. 2.

It appears from the *Premier Rapport ſur l'inoculation* of Dr. Petit, that the Hotel Dieu, a large hoſpital in the centre of Paris, is never free from the ſmall-pox, and that at certain times the ward deſtined to receive thoſe who are ſeized with that diſeaſe is extremely full; that notwithſtanding the multitude thus crowded together, and the enormous quantity of infection produced, and that in a place too which is open to the public, and where there is continually an immenſe concourſe of all ſorts of people, the diſeaſe is not obſerved to be always preſent in the neighbourhood of this hoſpital, nor, even to be more common there, than in other parts of the city.

Vous n'ignorez pas Meſſ. qu'en tout tems il y a des petites véroles dans l'Hôtel-Dieu de Paris ; que dans certaines ſaiſons, la ſalle deſtinée a recevoir ceux qui en ſont attaqués, eſt exceſſivement remplie : or cette multitude de malades ramaſſée dans un même lieu ouvert a tout le monde, et dans lequel il y a ſans ceſſe un concours immenſe de perſonnes de tous états, cette multitude, dis-je, ne forme-t'-elle pas un maſſe enorme de levain variolique, qui devroit au moins ſe répandre dans le voiſinage de cet hôpital placé au centre de la ville, et ſerré de tous côtés par les maiſons des particuliers ? Cependant on n'a point encore obſervé que dans ce voiſinage la petite vérole dûrat toute l'année, ou que ſeulment elle y fut plus commune que dans le reſte de la ville. Page 121.

A remarkable inſtance of the inſufficiency of contagion alone to the production of this diſtemper is authenticated by Dr. Sandifort, the preſent profeſſor of anatomy and ſurgery in the univerſity of Leyden.

One of the children in the orphan houſe at the Hague was ſeized with the ſmall-pox, and tho' the communication between the patient, and the reſt of the orphans was not interrupted, none of them caught the diſeaſe,

The fact is circumſtantially related by Dr. Nierop Junior of Amſterdam. His words are theſe.

Celeberrimus Sandifortius, Profeſſor in Anatomicis et Chirurgicis inſignis, tempore, quo praxin medicam Hagae Comitum feliciſſime faceret, in Orphanotrophio Hagano variolis laborantem tractavit, non propogato ad reliquos infantes alioſve eam domum incolentes contagio, licet porticus, in quo decumbebat variolans, cum tota domo commercium tam intimum haberet, ut ſæpius per illum tranſirent reliqui, et in eo quotidie deligarentur qui ope chirurgica indigebant, quemadmodum perbenigne mecum communicavit Cel. Vir.—*Nullum adeoque dubium*, adds he, *quin miaſma diſperſum ab aliis contrahi potuerit, generalis ſi adfuiſſet conditio prædiſponens, quæ ſufficeret ad morbum excitandum.* De contag. variol.

Another inſtance of the ſame kind and not leſs remarkable, I remember to have heard related by the celebrated Profeſſor Van Doeveren, of Leyden, in his lectures on the practice of medicine.

In the ſpring of the year 1762, a company of foot, with twelve children labouring under the ſmall-pox, entered the city of Groningen, which was then entirely free from that diſeaſe.—Theſe children were diſperſed in the houſes of the poorer ſort of inhabitants, in the midſt of numbers who had not had the diſtemper, and, who, conſtrained by their poverty, could not fly from its approach.—A fairer trial of the power of ſimple contagion could ſcarcely have been deviſed.—The event was ſuch as convinced the learned profeſſor that this power was inadequate to the effects which had been commonly aſcribed to it.—The Epidemic threatened was not produced, nor, which is more extraordinary, was the diſorder propagated ſporadically; for, after the moſt ſedulous inquiry, not an individual could be found to whom the infection had been communicated.

This fact has been likewiſe mentioned

by Dr. Forſten Verſchuir, an eminent phyſician at Amſterdam, in a diſſertation on inoculation, written in the Dutch language, and publiſhed in the Year 1769; and alſo by Dr. Nierop, in his *Specimen Medicum de Contagio varioloſo ex obſervationibus indagato.*

To multiply facts of this ſort would be eaſy, but I truſt that theſe will be quite ſufficient to eſtabliſh the poſition for which they were brought. I ſhall therefore quit this ground, and meet the antinoculiſts upon that, on which, they have hitherto thought themſelves ſecure of victory. I mean the Bills of Mortality. To the accuracy of theſe I ſhall wave every objection. Their evidence I ſhall admit to be good, and on that evidence will hazard the credit of inoculation.

It is an axiom in philoſophy, that the ſame cauſe, in ſimilar circumſtances, will always produce the ſame effect; and further, that the effect produced will be greater, or leſs, as the energy of the cauſe is increaſed, or diminiſhed.

Let us apply this to the Bills of Mortality. Let us ſee whether the number of deaths by the ſmall-pox has riſen and fallen, in proportion as inoculation has been more or leſs practiſed. If this ſhould be the caſe, there will be ſome reaſon for imputing that variation to inoculation. But if on the contrary it ſhould appear, that the one has not correſponded to the other, it will be evident, that the increaſe of mortality, and the practice of inoculation are not connected together as cauſe and effect.

In a period of ſeven years, immediately preceding the introduction of inoculation into this city, that is from the year 1714 to the year 1720 incluſive, the mean annual number of deaths by the ſmall-pox, compared with the mean annual number of deaths by all the other diſeaſes, was as one to eleven.—In the ſeven ſucceeding years the proportion was the ſame. From the year 1728 to 1734, the number of victims to the ſmall-pox was comparatively diminiſhed; the proportion which it bore to the number of thoſe who were cut off by the other diſeaſes being but as one to twelve.—From the year 1735, to the year 1741—and from the year 1742, to the year 1748, in the latter of which periods inoculation was more prevalent than it had ever been before, the ſhare which the ſmall-pox had in the General Mortality was reduced from the proportion of one to twelve, to that of one to thirteen. From the year 1749, to the year 1755—its ſhare was the ſame as in the firſt period above mentioned prior to the introduction of inoculation.

Since the year 1755, according to the ſame mode of computation, the mortality of the ſmall-pox, compared with the general mortality, has been augmented to the proportion of one to nine.—But it muſt be remembered, that, for a conſiderable part of this time, inoculation, tho' much practiſed in the country parts of England, made no progreſs in the capital. And if inſtead of the laſt ſeven, we take the laſt four years, during which inoculation has become very faſhionable, we ſhall find, by a ſimilar calculation, that the mortality in queſtion is again diminiſhing.

That the prevalence of inoculation, and the increaſed mortality of the ſmall-pox, have in no point of time coincided, I do not mean to inſinuate. According to the laws of chance, this muſt ſometimes have happened. But I contend, that the great irregularity of their coincidence may be conſidered as a freſh proof, that the one, is not the cauſe of the other.

Upon this fact, the defence of inoculation againſt the charge of increaſing the mortality of the ſmall-pox, might, perhaps, be ſafely reſted; but I ſhall add to it another, derived likewiſe from the Bills of Mortality, which appears to be concluſive.

For the fact alluded to, I am indebted to my ingenious friend Dr. James Sims, who has very obligingly furniſhed me with it from the materials which he has collected for the hiſtory of inoculation. I ſhall ſtate it in his own words.

‘ An objection has been made to inocu-
‘ lation, and lately ſupported with conſi-
‘ derable

‘ derable warmth by ſeveral reſpectable ‘ writers, which, if founded in truth, ‘ would be ſufficient to prove that the ‘ practice of this art is detrimental to ſo‘ciety. It is aſſerted, that, by inocula‘tion the contagion is ſo much propo‘gated, that the victims to the ſmall-pox ‘ have been more numerous ſince, than ‘ they were before, that practice obtained; ‘ and that the mortality has increaſed in ‘ proportion to the reception of the art’,

‘ To prove theſe aſſertions it has been ‘ uſual to extract the deaths by the ſmall‘pox, from the Bills of Mortality, for a ‘ certain number of years previous to the ‘ introduction of inoculation, and to com‘pare the general average of theſe, with ‘ the average of deaths ſince that time, and ‘ by dividing the latter into ſeparate periods ‘ of years, to ſhew, that the proportion ‘ of deaths by the ſmall-pox has been con‘ſtantly increaſing ſince the practice of ‘ inoculation began,

‘ Thus, one writer, who gives a view ‘ of the Bills of Mortality for eighty four ‘ years, ſhews, that in forty two years

‘ previous to inoculation, only ſeventy two ‘ deaths in every thouſand were owing to ‘ the ſmall-pox, whereas in forty two years ‘ afterwards, the deaths by that diſeaſe amounted to eighty nine in every thouſand; ‘ and, that, by dividing the latter of theſe ‘ into leſſer periods the average of deaths ‘ is as follows:—In the firſt twelve years, ‘ it is ſeventy four in a thouſand, in the ‘ next ten, eighty three, in the next, ninety ‘ ſix, and in the laſt ten, one hundred and ‘ nine.

‘ This conſtant increaſe is attributed to ‘ inoculation, and the argument appears ‘ to be properly ſtated, as it guards againſt ‘ any deception which might ariſe from the ‘ variations in the general number of deaths. ‘ I have endeavoured to ſtate this objection ‘ in the ſtrongeſt manner, and hope ‘ that I ſhall be able to give a deciſive anſwer to it.

‘ The reaſon why the above objection ‘ has not hitherto been ſatisfactorily anſwered, is this; thoſe who have attempted it, have taken the Bills of Mortality as ‘ garbled, and unfairly ſtated by the ob-

‘ jectors to inoculation, without giving ‘ themſelves the trouble of further exa- ‘ miation.

‘ The circumſtance in which the objec- ‘ tors have dealt unfairly by us is, that in ‘ taking the medium of deaths for a certain ‘ number of years prior to the practice of ‘ inoculation, as a fixed ſtandard, they ‘ have not once hinted that the mortality ‘ of the ſmall-pox had increaſed in the ſame ‘ proportion before, as it has done ſince, ‘ the introduction of that art; and by pru- ‘ dently publiſhing only a part of the bills, ‘ they have given us no opportunity of ‘ making this diſcovery. Had they given ‘ the whole of the bills, is it to be ſuppoſed ‘ that any man in his ſenſes would have ‘ joined with them in blaming inoculation ‘ for an increaſe, which commenced nine- ‘ ty years before inoculation was heard of ‘ in this country, and continued progreſ- ‘ ſive through the whole of that period?

‘ I ſhall not pretend to ſay what the ‘ cauſes are which have produced this in- ‘ creaſe of mortality, all that I mean to ‘ aver is, that the increaſe has been con-

‘ ſtant from the firſt bill, wherein the diſ-
‘ eaſes are ſpecified, to, almoſt, the preſent
‘ day. I ſay almoſt, becauſe, for the laſt
‘ twelve years, when I believe, every perſon
‘ will allow that inoculation has prevailed,
‘ perhaps ten times as much as at any
‘ time before, a conſiderable decreaſe has
‘ taken place.

‘ That I may, however, treat the reader
‘ fairly, I have in the firſt of the following
‘ tables given every Bill of Mortality that I
‘ could procure, and which, I have the
‘ utmoſt reaſon to think, are all that are
‘ now extant, wherein the ſmall-pox is
‘ diſtinctly ſpecified.

‘ Having theſe before him, if I ſhould
‘ draw any unjuſt concluſion, he will eaſily
‘ detect the error.

‘ The firſt column of this table ſhews
‘ the date of each bill; the ſecond, the
‘ number of deaths in each by all diſeaſes;
‘ the third, that part of the number which
‘ was owing to the ſmall-pox; and the
‘ fourth, the amount of this part in every
‘ thouſand of the whole.

‘ From this table I have formed ſix o-

‘ thers.—The firſt, conſiſts of periods of ‘ four years; the ſecond, of eight;—the ‘ third, of twelve; the fourth, of ſixteen; ‘ the fifth, of twenty; and the ſixth, of ‘ twenty four.

‘ In theſe tables, the firſt column contains ‘ the concluding years of each period; the ‘ ſecond, the annual average of all the ‘ deaths during that period; the third, the ‘ average of deaths by the ſmall-pox; and ‘ the fourth, the number in every thouſand ‘ of the whole ſum of deaths occaſioned by ‘ the above diſeaſe, as in the laſt column of ‘ the preceding table.

‘ The inſpection of theſe will ſerve to ‘ convince every perſon however prejudiced, ‘ that the increaſing mortality of the ſmall-‘ pox has exiſted, at leaſt, from the origin of ‘ the regiſters of mortality.

‘ So regular a progreſs cannot be ex-‘ pected in the firſt tables, as ſmaller pe-‘ riods of years muſt in ſome meaſure par-‘ take of the yearly inequality. But in the ‘ laſt table the progreſſion is perfectly re-‘ gular, down to the year 1772 incluſive, ‘ the ſeries being 48, 56, 72, 77, 101, and ‘ for the laſt four years 96.

‘ I know

‘ I know, that by an unequal diviſion of ‘ years I could have produced a ſeries re- ‘ gularly increaſing from the firſt number ‘ in table the ſecond of 19, to 119 in the ‘ ſame table, and then regularly decreaſing ‘ to 96 :—But I have avoided this mode of ‘ diviſion as too artificial, and made choice ‘ of the preſent as the faireſt and the leaſt ‘ liable to exception.

‘ The ſecond and third table will ſhew, ‘ that this mortality inſtead of increaſing, ‘ is at preſent conſiderably declining. For ‘ it appears by the ſecond, that the aver- ‘ age of deaths for four years preceding ‘ 1760, was 119 in a thouſand, and in ‘ the third, the average for the period pre- ‘ ceding 1765, was 112 ; for the next ‘ eight years to 1772, it was 105 ; and ‘ for the laſt four years only 96.

‘ To ſhew this declenſion more ac- ‘ curately, and place it beyond the miſ- ‘ repreſentation of thoſe, who, by taking ‘ ſuch a particular number of years as ‘ happens to anſwer their purpoſe, lay ‘ falſe concluſions before their readers, ‘ under the ſanction of apparently true cal- ‘ culations, I have conſtructed the eighth

‘ table: the columns are the ſame as in ‘ the former tables.

‘ It conſiſts of eleven diviſions, in ‘ which the number of years compared, ‘ increaſe regularly from one to eleven. ‘ In each of theſe I have, for obvious reaſons, begun with the laſt bill of mortality. ‘ In the firſt, the bill of the laſt year is ‘ compared with the bill of the year immediately preceding. In the ſecond, ‘ the medium of the bills for the laſt two ‘ years, is compared with that of the ſame ‘ number of immediately preceding years. ‘ In the ſucceeding ones, a year is regularly added, until the laſt, in which ‘ the mortality of the eleven years, ‘ from 1766 to 1776 incluſive, is compared with that of the years from 1755 ‘ to 1765 alſo incluſive. It will appear in ‘ this, as in the former tables, that an inequality prevails in all leſſer diviſions; ‘ but an evident decreaſe being ſeen in ‘ all the larger, will force us to conclude ‘ that the ſmall-pox does not deſtroy ſo ‘ many now as formerly, which happy ‘ diminution can I think ſcarcely be attributed to any other cauſe than the ‘ preſent prevalence of inoculation.

TABLE I.

Year.	Total of Deaths.	Deaths by the Small-Pox.	In 1000	Year.	Total of Deaths.	Deaths by the Small-Pox.	In 1000
1629	8771	72	8	1675	17244	997	58
1630	10554	40	3	1676	18732	359	19
1631	8562	58	7	1677	19067	1678	88
1632	9535	531	55	1678	20678	1798	87
1633	8392	72	8	1679	21730	1967	91
1634	10400	1354	130	1680	21053	689	33
1635	10651	293	28	1681	23971	2982	125
1636	23359	127	5	1682	20691	1408	68
1647	14059	139	10	1683	20587	2096	102
1648	9894	400	40	1684	23202	156	7
1649	10566	1190	112	1685	23222	2496	107
1650	8764	184	21	1686	22609	1062	47
1651	10827	525	48	1701	20471	1095	53
1652	12569	1279	102	1702	19481	311	16
1653	10087	139	13	1703	20720	896	43
1654	13247	812	61	1704	22684	1501	66
1655	11357	1294	114	1705	22097	1095	50
1656	13921	823	59	1706	19847	721	36
1657	12434	835	67	1707	21600	1078	50
1658	14993	409	27	1708	21291	1687	79
1659	14756	1523	103	1709	21800	1024	47
1660	15118	354	23	1710	24620	3138	127
1661	19771	1246	63	1711	19833	915	46
1662	16554	768	46	1712	21198	1493	92
1663	15356	411	27	1713	21057	1614	77
1664	18297	1233	67	1714	26569	2810	196
1665	97306	655	6	1715	22232	1057	48
1666	12738	38	3	1716	24436	2427	99
1667	15842	1196	75	1717	23446	2211	94
1668	17278	1987	109	1718	26523	1884	71
1669	19432	951	49	1719	28347	3229	114
1670	20198	1465	72	1720	25454	1440	57
1671	15729	696	44	1721	26142	2375	91
1672	18230	1116	61	1722	25750	2167	84
1673	17504	853	49	1723	29197	3271	112
1674	21201	2507	118	1724	25952	1227	47

TABLE

TABLE I. continued.

Years.	Total of Deaths.	Deaths by the Small-Pox.	In 1000	Year.	Total of Deaths.	Deaths by the Small-Pox.	In 1000
1725	25523	3188	125	1751	21028	998	47
1726	29647	1569	53	1752	20485	3538	172
1727	28418	2379	84	1753	19276	774	40
1728	27810	2105	77	1754	22696	2359	103
1729	29722	2849	96	1755	21917	1988	90
1730	26761	1914	71	1756	20872	1608	77
1731	25262	2640	104	1757	21213	3296	154
1732	23358	1197	51	1758	17576	1273	72
1733	29233	1370	46	1759	19604	2596	132
1734	26062	2688	103	1760	19830	2187	110
1735	23538	1594	67	1761	21063	1525	72
1736	27581	3014	100	1762	26326	2743	104
1737	27832	2084	74	1763	26143	3582	137
1738	25825	1590	61	1764	23202	2382	102
1739	25432	1690	66	1765	23230	2498	107
1740	30811	2725	88	1766	23911	2334	97
1741	32169	1977	61	1767	22612	2188	96
1742	27483	1429	52	1768	23639	3028	128
1743	25200	2029	80	1769	21847	1968	90
1744	20606	1633	79	1770	22434	1986	88
1745	21296	1206	56	1771	21780	1660	76
1746	28157	3230	114	1772	26053	3992	153
1747	25494	1380	54	1773	21656	1039	48
1748	23869	1789	75	1774	20884	2479	119
1749	25516	2625	102	1775	20514	2669	130
1750	23727	1229	51	1776	19048	1728	90

TABLE

TABLE II.

Containing Periods of Four Years.

Concluding Year of each Period.	Annual Medium of the Total Deaths.	Annual Medium of Deaths by the Smallpox.	In 1000.
1632	9355	175	19
1636	13200	461	35
1650	10820	478	44
1654	11682	688	58
1658	13176	840	63
1662	16549	972	58
1666	35924	584	16
1670	18187	1399	76
1674	18166	1293	71
1678	18930	1208	63
1682	21861	1761	80
1686	22405	1452	64
1704	20839	951	45
1708	21208	1145	53
1712	21862	1642	75
1716	23573	1977	83
1720	25941	2191	80
1724	26760	2260	84
1728	27849	2310	83
1732	26275	2150	81
1736	26603	2166	81
1740	27472	2022	73
1744	26364	1767	67
1748	24704	1901	76
1752	22689	2097	92
1756	21190	1682	79
1760	19580	2338	119
1764	24183	2558	105
1768	23348	2512	107
1772	23028	2401	104
1776	20525	1978	96

TABLE III.

Containing Periods of Eight Years.

Concluding Year of each Period.	Annual Medium of the Total Deaths.	Annual Medium of Deaths by the Smallpox.	In 1000.
1636	11277	318	28
1654	11251	583	51
1662	14862	906	60
1670	27055	991	36
1678	18548	1250	67
1686	22133	1606	72
1708	21023	1048	49
1716	22717	1809	79
1724	26350	2225	84
1732	27062	2230	82
1740	27037	2094	77
1748	25534	1834	71
1756	21939	1889	86
1764	21881	2448	112
1772	23188	2456	105
1776	20525	1978	96

TABLE IV.

Containing Periods of Twelve Years.

1650	11125	371	33
1662	13802	833	60
1674	24092	1092	45
1686	21065	1473	69
1712	21303	1246	58
1724	25424	2142	84
1736	26909	2208	82
1748	26180	1896	72
1760	21153	2039	96
1772	23519	2490	105
1776	20525	1978	96

TABLE

TABLE V.

Containing Periods of Sixteen Years.

Concluding Year of each Period.	Annual Medium of the Total Deaths.	Annual Medium of Deaths by the Smallpox.	In 1000.
1654	11214	450	40
1670	20958	948	45
1686	20340	1428	70
1716	21870	1428	65
1732	26706	2227	83
1748	26285	1969	74
1764	21910	2168	98
1776	22300	2297	103

TABLE VI.

Containing Periods of Twenty Years.

1658	11637	528	45
1678	21551	1091	50
1712	21635	1390	64
1732	26080	2177	83
1752	25566	1990	78
1772	22265	2298	103
1776	20525	1978	96

TABLE VII.

Containing Periods of Twenty-four Years.

1662	12463	602	48
1686	22578	1282	56
1724	23363	1694	72
1748	26544	2052	77
1772	22336	2269	101
1776	20525	1978	96

TABLE VIII.

Containing the Medium of the laſt Year's Bills of Mortality, compared with that of the ſame Number of Years immediately preceding, in a regularly increaſing Series.

Concluding Year of each Period.	Annual Medium of the Total Deaths.	Annual Medium of Deaths by the Smallpox.	In 1000.	
1776	19048	1728	90	One Year each.
1775	20514	2669	130	
1776	19781	2198	111	Two Years each.
1774	21270	1759	82	
1776	20148	2292	113	Three Years each.
1773	23163	2230	96	
1776	20525	1978	96	Four Years each.
1772	23028	2401	104	
1776	21631	2381	110	Five Years each.
1771	22262	2166	97	
1776	21655	2261	104	Six Years each.
1770	22945	2333	101	
1776	21481	2221	103	Seven Years each.
1769	23512	2568	109	
1776	21777	2190	100	Eight Years each.
1768	23765	2535	106	
1776	21983	2283	103	Nine Years each.
1767	22880	2559	111	
1776	22045	2273	103	Ten Years each.
1766	22219	2441	109	
1776	22216	2277	102	Eleven Years each.
1765	21916	2334	106	

The body of evidence now adduced in favour of inoculation, amounts I may venture to ſay to a demonſtration, that the charge which has been preferred againſt it, of ſpreading the contagion, and increaſing the mortality of the ſmall-pox cannot poſſibly be true. It is a queſtion therefore, which will naturally be aſked in this place, to what cauſe, then, is the increaſe to be aſcribed? I anſwer it is, perhaps in ſome meaſure to be aſcribed, to a difference in the number of inhabitants, on the principle before explained; and likewiſe to the communication between thoſe afflicted with the natural ſmall-pox, and thoſe liable to take the infection, which ſeems to have been growing greater, as the dread of receiving the diſtemper has grown leſs. But as theſe, and ſome other cauſes, which I paſs over, have not operated from the commencement of the increaſe, it is clear, that the principal one is yet to be ſought for; and this, I am inclined to believe, will be found in the more frequent recurrence of varilous Epidemics. But, why theſe ſhould be more frequent at preſent, than they were a Century ago, is an inquiry which cannot be proſecuted with any probability of ſucceſs until we are better acquainted with the nature of the cauſe from which they originate. That they do not ariſe from ſimple contagion has been fully proved; and, indeed, independent of that proof, the regularity of their recurrence in many places, which are never free from contagion, might be ſufficient to convince us, that they ſpring from a very different cauſe.

In London, variolous Epidemics do not ſeem to be governed in their viſitation by any fixed period of time; but in the Hague, where the quantity of contagion is probably always as great, in proportion to the number of Inhabitants, as in London, they have been obſerved to return every five years. In Leyden, the time of their return appears to be the ſame. In Groningen, it is every five or ſix years. In Switzerland, every ſix. In ſome parts of Norway, every ſeven, in others, every ten or twelve. And in Bengal, every ſeven years.

But, whatever may be the cauſe of the increaſe in queſtion, the only mean of counteracting its operation, which appears to be adequate and practicable, is a *more general* inoculation; the efficacy of which, is plainly evinced by the influence that, this practice even in its *preſent ſtate*, ſeems to have had on the bills of mortality.

But to inculcate the uſe of this ſalutary art to the affluent claſs of the Inhabitants of this City, who have long experienced its utility, would be unneceſſary; and to recommend it to the poor, without furniſhing them with the power of adopting it, would be offering an inſult to humanity.

To conſiderations of this kind, the inſtitution for inoculating the poor of London at their own habitations owes it birth. But, as ſome of the wiſeſt and beſt ſchemes in favour of humanity, have at firſt been ſtigmatized as miſchievous, or treated as ridiculous, it was not expected that this would meet with a better fate. It has, accordingly, been repreſented "as

" fraught with very dangerous conſe-" quences to the community," and as tending, by ſpreading the contagion, to increaſe the very evil it was deſigned to leſſen.

This is the charge which has been brought againſt the above mentioned eſtabliſhment in particular, as well as inoculation in general, a charge, which I flatter myſelf has been compleatly refuted in the preceding pages. But, that refutation will at once produce an acknowledgement of conviction, and convert oppoſition into patronage, I am not ſo ſanguine as to expect.

The clamours of prejudice, envy and ſelf intereſt will, for a time, engage the public ear, but, I truſt, that the voice of truth and juſtice, of humanity and ſound policy, will at length prevail; that the practice of inoculation will become univerſal, and the mortality of the ſmall-pox be nearly annihilated.

FINIS.

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